

PGDM / IB , 2012 -2014
Logistics & Warehousing Management
DM – 441 / IB – 442
Trimester – IV, End-Term Examination : September 2013

Time allowed : -- 2 Hrs 30 Min

Max. Marks: 50

Roll No : _____

Instructions: Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means**. In case of rough work please use answer sheet

Sections	No of Questions to attempt	Marks	Marks
A	3 out of 5 (Short Questions)	5 Marks each	3 * 5 = 15
B	2 out of 3 (Short Questions)	10 Marks each	2 * 10 = 20
C	Compulsory Case Study	15 Marks	15
		Total	50

Section A

- Q 1. What specific role does logistics mix play in supply chain operations?
- Q 2. What is inventory and why is it required? What are the three key challenges in inventory management ? What are the costs associated with inventory ?
- Q 3. What is Intermodal transportation and why is it preferred ?
- Q 4. What are the principles, components and techniques of Forecasting? Why is Forecasting a necessary evil?
- Q 5. Write short notes on :--
(a) Consolidation
(b) Break Bulk
(c) Cross Docking

Section B

- Q 1. There is no Logistics strategy that is always right but there is a right Logistics Strategy for a given Competitive Strategy. Comment.
- Q 2. Explain the relationship between "Shrinking Service Window" and Customer service. What role does Logistics play towards achieving the ideal of a perfect order?
- Q 3. With the help of examples explain the role of Logistics & Warehousing and Product Life Cycle?

Section C

Case Study : Amazing Story of Mumbai Dabbawalahs

Mumbai, a city unique in many ways, is located on the western coast of India, surrounded by the Arabian Sea. People from different ethnic backgrounds live in Mumbai. Over time the city has expanded considerably and this has created considerable pressure on the civil amenities and infrastructure. The working population generally commutes quite a long distance from home to work place and often takes more than an hour in commuting. Local people generally rely on public transport to travel, which is mainly due to traffic congestion, lack of parking space and not so good road condition. Hence the local rail provides the lifeline to the city. The Western and Central Railways are the main operators and cater to the over six millions daily commuters of this metropolitan city.

MUMBAI DABBAWALAHS

Mumbai dabbawalahs have demonstrated to the business world one of the most amazing distribution networks, which they have been operating since 1890s. Mumbai has always attracted people from different parts of India as it provides many opportunities for work. Indians traditionally love home-cooked food. People from different communities have different taste and preference of food. During early days, there was hardly any culture of canteens or fast food centers. Mr. Mahadeo Havaji Bacche (Mahadeo) sensed an opportunity here and developed the lunch-box delivery services with about 100 uneducated-unemployed people -- the 'Bombay *dabbawalahs*'. As the Mumbai population grew, the operations of Mumbai *dabbawalah* also expanded. In 1954, they organized themselves with the formation of Nutan Mumbai Tiffin Box Suppliers' Charity Trust. By the year 2000, they were delivering almost 2,00,000 lunch-boxes a day. Taking return trip also into account, there are 4,00,000 manual transactions involved with customers each day. The total turnover exceeds Rs. 36 crores per annum. Now they are operating with around 5000 *dabbawalahs*, who are responsible for the success of this supply network. In 1998, the interest in the Mumbai *dabbawalah's* distribution system came into the limelight when Forbes global Magazine ranked its operational excellence at a Six Sigma level with an accuracy rating of 99.999999. Forbes Global Magazine noted, "Mumbai's *tiffinwalahs*" have achieved a level of service to which Western businesses can only aspire. "Efficient organization" is not the first thought that comes to mind in India, but when the profit motive is given free rein, anything is possible. To appreciate Indian efficiency at its best, watch the *tiffinwalahs* at work."

Organization: There are thirteen positions at the top, starting from the President and followed by the Vice President, Secretary, Treasurer, and nine Directors. At the field level, there are around 5000 *dabbawalahs*, who are coordinated and supported by few *Makadams*. They help in training new *dabbawalahs*, resolving disputes, maintaining the payment-receipt records, acquiring and communicating with new customers, and most importantly sorting lunch boxes. There has never been a strike by the workers as they are treated as shareholders.

Most importantly, the teamwork and coordination are at their best. There are three golden rules for ensuring discipline in the system: (i) every *dabbawalah* has to wear a white cap during working hour, (ii) they cannot take alcohol during duty (iii) they have to carry their identity card. The purpose is to keep their identity known and visible to public. Local Mumbai people are generally aware of the importance and urgency involved in the working of these *dabbawalahs*. For traffic crossing and train loading they get natural support from these locals. During loading period in the morning, railway provides sorting area on the platform for the *dabbawalahs*. They also get special railway compartment during 10.00 to 11.30 AM in trains going south.

OPERATIONS OF MUMBAI DABBAWALAH

Office going people, school children and businessmen in Mumbai generally leave home in early hour of the day and travel long distance to reach to their respective work place. Mumbai *dabbawalahs* are ready to provide the services of bringing the lunch-box from home to the work place and back. The pick-up of the lunch box with hot home-cooked food from home starts around 10.30 in the morning. Then starts the excellence model of distribution system of Mumbai *dabbawalahs*. An illustration of the movement of the lunchbox is shown in Table 16.1.

TABLE 16-1

AN ILLUSTRATIVE MOVEMENT OF LUNCH BOXES

TIME AND PLACE	ACTIVITY
10:34-11:20 am: Andheri Station.	This is the most crucial time as lunch boxes are to be loaded in a wooden crate filled with lunch in the train. Generally, they choose to occupy the last compartment of the train.
11:20 - 12:30 pm: Church Gate Station	Unloading at the destination station and re-arrangement of lunch boxes takes place as per the destination area and destination building code
11:20 -1:15 (At all Destination Stations)	Lunch time at the destination point
1:15- 2:00 pm (At all Destination Stations)	Reverse logistics starts with pick up of the lunch box from the office Segregation is done as per the destination code
2:00 - 2:30 pm (At Destination Station)	Segregation is done as per the destination code
2:48-3:30 pm (In train)	Return journey by train
3:30 - 4:00 pm: The originating station	Final sorting and dispatch to the origin area

Cost of Operation: The cost of operation of the distribution network of the Mumbai *dabbawalah* is amazingly low. Monthly charge for a customer is around Rs. 300 per lunch box and an annual bonus during festival season. In some cases, due to very long distance covered or due to big size of a lunch box the monthly charge may be little higher. Despite this, the total revenue generated is around Rs. 360 million.

Low cost of operation has helped in their expansion, customer retention and generating economy of scale. *Dabbawalahs* do not use any motor vehicle for the lunch-box movement. For a long distance travel for example, home pick-up at Andheri and office drop at Churchgate (Figure 16.1), local suburban train services are used. The use of mass transport system is very economical as the fare for a daily commuter on these local trains is quite low. Not only cost, but also the time to travel is the minimum possible, as compared to other modes of transport. Movement of lunch-boxes from home to the nearest originating suburban station is through bicycle, hand-pulled wooden cart or in many cases *dabbawalahs* carry these packed lunch-boxes in their hand held bags.

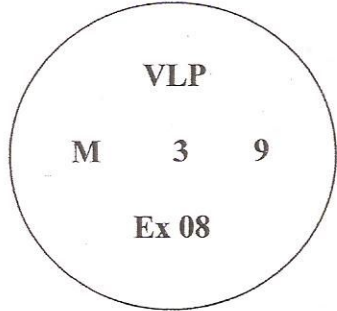
Error-free Distribution: When we talk of error in the context of six sigma, it relates to CTQs (Critical-to-Quality). CTQs for Mumbai *dabbawalahs* are those service quality characteristics, which are critical for the customers. For their customer, there are three important CTQs. Everyone will like to have his own lunch-box and no one else's. Second, it should be delivered neither too early nor too late. If delivered too early, the food would not remain

warm and fresh. It delivered late, lunchtime would be over. However, the cost of the service should be low as a higher cost would dissuade customers from using this service. Error-free delivery has been achieved with the help of a unique codification system for the lunch-boxes.

Coding System for the Lunch boxes: The coding of lunch-box from Vile Parle to Churchgate is shown in Figure 16.2. The coding system is unique, very simple and *ad hoc* but serves its purpose. The coding has a flow logic, which ensures complete traceability and defines flow directions in both situations of forward logistics and reverse logistics of lunch boxes. Even a semi-literate or an illiterate *dabbawallah* with little training can recognize the coordinates of destination office and originating station through a simple combination of alphabets, numbers and color codes.

At the point of aggregation and sorting, a symbol A, B, C, D... indicates the start point of the forward distribution node. For example, at aggregation and sorting node D, all the lunch boxes from homes having D residential station would be brought. In the reverse logistics, or return trip when empty lunch boxes are coming back from offices to home, this code automatically becomes the destination code.

Legends	Meaning
VLP	Vile Parle (suburb in Mumbai)
9EX08	Code for Dabbawalahs at destination
Ex	Express Towers (building name)
08	Floor no.
M	Code for Dabbawalahs at residential station
3	Code for destination station, e.g. Churehgate station (Nariman Point)



Distribution in the forward flow has a destination code for distribution. This is indicated by zones of destination.

Distribution Network Design: The coding system effectively gets operationalized through a unique combination of "milk-run" and "hub and spoke" type of distribution network, which at times looks like a "Just in Time" system. A *dabbawallah* goes to houses allocated to him, one after another. He almost runs while he collects from one home to another. Housewives generally keep lunch-box ready as these *dabbawalahs* are never ready to wait. In the process, one *dabbawalah* collects around 20 lunch boxes.

Here, the challenge is to cover a wide catchments area as each collection point may be little away from its preceding or succeeding point. So, this supports wide coverage, optimal utilization of *dabbawalah's* capacity, time-flexibility in starting the day's operation by a *dabbawalah* so as to meet the target collection, and operational ease. If we compare this with a milkman delivering milk or a newsvendor delivering newspaper in a residential colony, the approach is similar. Intuitively, they adopt the shortest path to cover all the houses on their route with a start, originating from his own residence to a finish or the final destination, which in case of *dabbawalah* is the originating railway platform. This portion of the distribution-network of Mumbai *dabbawalah* resembles a 'milk-run' system. From point to the destination railway station, the movement is in suburban trains. This results in cost advantage, time saving, road congestion avoidance, safety and ease of movement in the long distance involved. Mass transport system like railways are generally very cost effective as compared to other options.

How about the distribution network beyond the destination railway station? All lunch-boxes, which are loaded in the train at different railways stations but coded for a particular railway station, say Vile Parle, are offloaded here. From this railway station, the distribution of the lunch boxes is done in manner similar to the 'hub and spoke' system. This supports volume flexibility, operational ease, short response time, and cost advantage. This destination railway platform is now hub of the distribution point and different *dabbawalahs* take their lunch box load for different office buildings. Generally, many offices are located in one building. Consolidation of distribution is needed now. All lunch boxes of one multistoried building or few adjoining offices are sorted according to the coding system on the lunch boxes. It displays the building or office premise code very prominently. This element of the lunch-box code is the basis of movement now onwards. The movement paths henceforth resemble spokes in different directions emanating from the off-loaded point on the platform. Interestingly, adaptation of these configurations is not by an elegant design but by intuition and experience. Nothing can fully substitute intuition and experience in a business decision. Probably, a very cumbersome and well designed mathematical model would have also minimized the four objectives,* which *dabbawalahs* have achieved—total cost of transportation, *total time taken to deliver the lunch boxes, error rate or wrong delivery in the system, and total distance travelled in the whole movement plan. With the dynamic changes in the number of customers and their requirements, route constraints etc, dabbawalahs generally strike at the best tradeoff solution for a real life problem, which often deals with multiple objectives.*

Use of Modern Technology: Traditionally, use of modern technology is almost absent for tracking the movement of lunch boxes. There is no use of motor vehicle for transport. The success of such a complex delivery network in a spider's web route of Mumbai without computer and MIS has certainly some learning lessons, which a supply chain manager can have. Investment in the technology and its maintenance must be weighed against the benefits not only to the users like *dabbawalahs* but one should also look at the ultimate incremental benefit and cost to the customers. It is therefore no surprise that with incoming calls are free in India and mobile service providers coming out with life-time incoming free connection with nominal initial charges, these *dabbawalahs* are-getting initiated to this type of communication mode. More recently, they have introduced booking for delivery through SMS and their website. These involves negligible operating expenses. But they still use orthodox push-carts, cycles and head carrier for local distances as any other mode would increase the cost substantially.

The commitment, friendliness and customer orientation are the hallmark to the operational efficiency of Mumbai *dabbawalah's* distribution system, which is well reflected in their unprecedented growth and customer loyalty.

Q 1. List five major aspects of *Dabbawalahs* functioning in relation to their logistics and distribution efficiency. How have the *Dabbawalahs* leveraged the various elements of Logistics mix in their operations?

Q 2. What role does information and information technology play in Logistics? How have the *Dabbawalahs* utilized this cross functional driver of logistics?

Q 3. Mumbai *Dabbawalah's* distribution system is marked by decentralization at the operational level. Yet it works as a coordinated chain". Discuss.

[5,5,5 = 15 Marks]